

**UNITED STATES PATENT APPLICATION**

of

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for

**TABLE HAVING H-CENTER SUPPORT ASSEMBLY**

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## **TABLE HAVING H-CENTER SUPPORT ASSEMBLY**

### **CROSS-REFERENCE TO RELATED APPLICATIONS**

**[001]** This application claims priority to and benefit of Chinese Application No. 02259585.6 filed September 27, 2002 and entitled "A Type of Folding Table," which application is incorporated herein by reference in its entirety.

### **BACKGROUND OF THE INVENTION**

#### **Field of the Invention**

**[002]** The present invention generally relates to furniture such as tables and, in particular, to tables having a central plane supporting structure.

#### **Description of Related Art**

**[003]** As modern furniture, whether for home or office, becomes more practical, the demands for functionality have been increasing. For example, folding furniture has become more in demand. The kind of folding furniture that has received the most attention are tables and chairs.

**[004]** A conventional folding table that can be used, for example, for outdoor activities is shown in Figure 1. Its main components include a table top 1' and table frame 2'. As shown in the accompanying figure, the table frame 2' includes two side rails 21', three cross bars 22', two sets of foldable legs 23', and two support braces 24'. The side rails 21' are fastened to the underside of the table top 1'. The three cross bars 22' are separately and pivotally attached to both ends and the middle portion of the side rails 21'. The two sets of table legs 23' are separately fastened to the ends of the end

rails 22'. One end of the support braces 24' is fastened to the table legs 23' and the other end of the support braces is pivotally attached to the cross bar 22' which is attached to the center portion of the side rails 21'.

[005] When folding the table legs 23' of the conventional table shown in Figure 1 into the collapsed position, one turns the table top 1' so that the underside of the table top is facing upwards. The table legs 23' are then folded downwardly towards the table top. Because the cross bars 22' that are fastened to the table legs 23' are pivotally attached to the side rails 21', and the support braces 24' are pivotally attached to the table legs 23', the table legs 23' come to rest on the underside of the table top 1', thus reducing its volume.

[006] The center portion of the table top 1' of this type of conventional folding table, however, is only supported by one cross bar 22' that pivotally attached to the two support braces 24'. This may allow the center portion of the table to undesirably deflect, shift or move. In addition, if the cross bar 22' in the center portion of the table top is damaged, the entire table frame 2' must be removed in order to allow repair or replacement of the damaged cross bar. Removing the entire table frame 2' from the table top 1' often requires a significant amount of time and effort

## BRIEF SUMMARY OF THE INVENTION

[007] A need therefore exists for a table that eliminates the above-described disadvantages and problems.

[008] One aspect of the invention is a folding table that has strong support and that is easy to maintain. The folding table, for example, may include a table top with a top surface and a bottom surface; a mounting structure centrally disposed on the bottom surface of the table top; a support assembly at least partially connected to the mounting structure; and a frame assembly including a first leg connected to the bottom surface of the table top; and a support brace having a first end and a second end, the first end being attached to the first leg and the second end being attached to the support assembly.

[009] The mounting structure may include a pair of C-shaped mounting ridges formed on the bottom surface of the table top.

[010] The support assembly may include a pair of spaced apart side rails configured to be attached to the mounting structure; and a first cross bar disposed transverse to the pair of side rails.

[011] The support assembly may include a pair of spaced apart side rails configured to be attached to the mounting structure; and a pair of spaced apart end rails disposed transverse to the pair of side rails.

[012] The support assembly may be formed integrally with the table top.

[013] The table top may be formed of blow-molded plastic.

[014] The mounting structure may be formed of blow-molded plastic.

[015] The frame assembly may include a pair of spaced apart side rails and a pair of spaced apart end rails disposed transversely to the pair of side rails and connected therebetween, wherein the table leg is connected to one of the pair of end rails.

[016] When the above-described structure is adopted, the center of this table is supported by the central support assembly. Preferably, the central support assembly is pivotally attached to the support braces. Advantageously, the central support assembly in conjunction with the mounting structure provides a “planar” support strength that may be greater than the “linear” support strength of conventional tables. In addition, if the central support assembly is damaged, all that is required is to detach it from the mounting structure to repair it. It is not necessary to detach the parts of the outer support assembly, and thus less time and effort is required for maintenance.

[017] These and other aspects, features and advantages of the present invention will become more fully apparent from the following detailed description of preferred embodiments and appended claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

[018] The appended drawings contain figures of preferred embodiments to further clarify the above and other aspects, advantages and features of the present invention. It will be appreciated that these drawings depict only preferred embodiments of the invention and are not intended to limit its scope. The invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

[019] Figure 1 is a perspective view of a conventional folding table with legs that are pivotally attached to a table frame;

[020] Figure 2 is an exploded perspective view of a folding table in accordance with a preferred of the present invention;

[021] Figure 3 is a perspective view of the folding table shown in Figure 2, illustrating the legs in an extended position; and

[022] Figure 4 is a top view of the folding table shown in Figure 2, illustrating the legs in a collapsed or folded position.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[023] The present invention is generally directed to structures having reinforced center regions provided by a generally “H”- shaped center support. Advantageously, the “H”-shaped center support may provide a “planar” support structure versus the “linear” support structure that was provided in conventional tables. The “H”-shaped center support may provide added strength to the structure, whether the structure is a table, chair, shelf, or other type of furniture. While the present invention is described with relation to a folding table, it will be appreciated that the “H”-shaped center support may be used in connection with other suitable types structures.

[024] As shown in Figures 2 and 3, an exemplary folding table includes a table top 1, a table frame 2, and a support assembly 3. Table top 1 can be constructed out of plastic such as, but not limited to, blow molded plastic or injection molded plastic. Other suitable materials include, but are not limited to wood and metal.

[025] Table frame 2 includes two spaced apart side rails 21, two spaced apart cross bars or end rails 22 that are connected to the side rails, two sets of table legs 23 connected to the end rails, and two support braces 24. Each side rail 21 is fastened to the underside of one side of table top 1. The side rails 21 include connecting apertures at each end. An end rail 22 is disposed in the facing connecting apertures of a pair of side rails 21.

[026] Each table leg set 23 includes a pair of table legs 231 and a cross bar 232. One end of each table leg set 23 is fastened to an end rail 22. The support braces 24 are constructed from three support bars 241, 242, and 243. One end of the first and second support bars 241 and 242 is separately and pivotally attached to the lower part of the two table legs 231. The other ends converge and are pivotally attached to one end of

the third support bar 243. The pivot area on this third support bar 243 is encircled by a sliding locking ring 244 so that, when the table is supported, the force of gravity detains the first and second support bars 241 and 242, preventing the table legs 23 from folding and thus increasing the firmness of the table legs 23. The other end of the third support bar 243 is pivotally attached to the support assembly 3.

[027] A mounting structure 11 is formed on the underside of the table top 1. In one embodiment, the mounting structure 11 includes a pair of generally C-shaped mounting ridges each mounting ridge having an elongate central portion and two shorter end portions. The mounting ridges face each other so that a box-like region is formed at the center of table top 1.

[028] The mounting structure 11 can be formed integrally with table top 1 during the blow-molded process or injection molding process to form a one-piece structure. Thus, the mounting structure 11 is formed in a single step and does not require additional manufacturing or cooling time. Alternatively, the mounting structure 11 could be formed from discrete parts and later attached or adhered to table top 1. The mounting structure 11 is configured to support at least a portion or the entire support assembly 3.

[029] The support assembly 3 is preferably constructed with a generally "H"-shape configuration with two side rails 31 and two cross bars or end rails 32. Each side rail 31 is desirably attached to the inside surface of a mounting ridge of the mounting structure 11. The side rails 31 include connecting apertures at each end. An end rail 32 is disposed in the facing connecting apertures of a pair of side rails 31. An end of the third support bar 243 of a support brace 24 is pivotally attached to an end rail 32. One



skilled in the art will appreciate that the support assembly 3 could have other suitable shapes and configurations depending, for example, upon the intended use of the table.

[030] Because the support assembly 3 has a generally “H”-shaped structure, the support assembly 3 provides a “planar” support structure to the central portion of table top 1. It will be appreciated that the generally “H”-shaped structure of the support assembly 3 may be formed from two side rails 31 and two end rails 32 or from a single end rail 32 disposed between a pair of end rails 31 (forming a true “H”). A “planar” support structure distributes forces along the plane. In contrast, the center portion of a conventional table top was often supported by a “linear” structure in which the forces were focused along a central line. Thus, failure of the table top 1 is more likely with a “linear” structure than with a “plane” structure. Therefore, the embodiments of the present invention provide unique mounting structures for support braces 24 which ultimately provide greater support strength for the table top 1.

[031] In addition, when support assembly 3 is damaged, it can be replaced or repaired simply by detaching the two side rails 31. Thus, there is no need to go to the trouble of disassembling the entire table frame 2. Furthermore, the ridge-shaped nature of the mounting ridges provides that fastening structure such as bolts, rivets, nails and the like are protected from exposure. Of course, any suitable type of fastener or connectors could be used to attached the support assembly 3 to the table or assemble the table.

[032] In order to fold the table into the collapsed or storage positoin, as shown in Figure 4, the table is preferably turned upside down with the underside facing up. Under the effect of gravity, the locking ring 244 may automatically slide down under the effect of its own weight and will remove the constraint on the pivoting region of the

support braces 24. Applying force to the pivoting region folds the two sets of table legs 23 in a downwards direction. The table legs 23 will come to rest on the underside of the table top 1, thus facilitating storage or transport.

[033] It will be appreciated that the “H”-shaped support assembly may be used in any table or structure requiring such support. For example, the “H”-shaped support structure may be used in non-folding tables. It may also be used for other structure including chairs, shelving, and the like. Further, depending upon the type of structure used in connection with the support assembly, the support assembly could have other suitable shapes, sizes and configurations.

[034] Although this invention has been described in terms of certain preferred embodiments, other embodiments apparent to those of ordinary skill in the art are also within the scope of this invention. Accordingly, the scope of the invention is intended to be defined only by the claims which follow.